An Evaluation of the Economics of Hypertension: How Can We Control the Problem and Its Costs?

An Honors Thesis (ID 499)

by

Gretchen A. Melichar

Dr. Ray Montagno

Ball State University

Muncie, Indiana

May 1988

Spring 1988

My senior honors project has consisted of two components: a research paper and practical experience by way of observation and communication with wellness experts. The library work that ultimately went into the research paper has been done to increase my knowledge about a topic in the health-related field. The practical experience has come about from observing presentations, lectures, and the actual functioning of a company's wellness resource center.

I chose to focus my area of research on hypertension and the implications it can have on businesses. My study of this topic has increased my understanding of a health-related concern which I knew very little about.

I spent time at Blue Cross Blue Shield, Indianapolis, in the Wellness Resource Center. While at Blue Cross Blue Shield, I had the opportunity to talk with several staff members and learn more about what various companies are doing to promote wellness in the workplace. This experience has given me new insight into how wellness is a relevant area of concern for businesses today.

Therefore, the following work is divided into two (2) separate sections. The first section is the research paper on hypertension, and the second section is a summary of my activities with Blue Cross Blue Shield. The two sections are separate from each other in content, but both components are part of my senior honors project.

An Evaluation of the Economics of Hypertension: How Can We Control the Problem and Its Costs?

Part A

TABLE OF CONTENTS

INTRODUCTION

Facts and Concerns

Hypertension, an increase in blood pressure within arteries and arterioles, is the most prevalent of all cardiovascular diseases. Because it does not make a person feel ill and rarely causes symptoms, many people who have high blood pressure are not even aware that they fall outside the normal blood pressure range. In a 1972 survey only 51% of persons with hypertension were aware of their condition. The statistics have improved as awareness has increased, and in 1984 85% of all hypertensives were aware they had high blood pressure. However, education and aggressive treatment programs for hypertension are still a necessity (Charles Lenfant, 1987, p. 2709). Basically the only reliable way to diagnose hypertension is to have your doctor take your blood pressure using an instrument called a sphygmomanometer. People often learn they have raised blood pressure when they visit the doctor about something else. The fact that many people do not know they are at risk for high blood pressure is a cause for concern among health educators, physicians, employers, and society in general. Information and education about hypertension (used interchangeably with high blood pressure), must be emphasized so people will become more aware of the risks,

and what they can do on an individual basis to control these risks.

The United States Public Health Service defines hypertension as a condition in which the flow of blood consistently exerts too much pressure against the walls of the blood vessels. Over a period of years, excessive pressure can damage the heart and blood vessels and result in premature aging of the arteries (Sharon Johnson, 1985, p. 168). High blood pressure increases the risk of stroke, heart failure, sudden death, heart attack, peripheral blood vessel disease, and kidney failure. Only recently it has been determined that 30.8 million American workers were afflicted with the disease, which contributes directly or indirectly to about 1 million deaths per year (American Heart Association, 1986, p. 41). The American Heart Association (AHA) now estimates that one out of every five individuals in the United States has hypertension, and that two out of three aged 65 or over have the disease. As the number of elderly persons increases, high blood pressure will become a more significant public health problem.

In 1980 three principal areas of concern were expressed by the National Institute of Health (NIH) regarding hypertension control. These include: 1.) increasing the public's knowledge of high blood pressure, 2.) encouraging the adoption of behaviors conducive to high blood pressure control, and 3.) implementing systems designed to improve

control methods (Lenfant, p. 2709). The Institute has conducted various surveys since 1980, and there is evidence of progress in meeting the goals that relate to these areas of concern. More respondents than ever seem to understand the consequences of high blood pressure and are taking steps to reduce potential risks. The nation's hypertension objectives can only be met if both public and private organizations continue to educate about hypertension, and if individuals make an effort to control the disease.

Definitions

Before discussing further issues, it is necessary to define several terms that will be used throughout the following pages.

Systolic pressure. The pressure on the blood vessels when the heart muscle contracts (pumping measure); the level to which the arterial pressure rises with each contraction.

Diastolic pressure. The pressure in the blood vessels when the heart muscle relaxes (resting measure); the level of arterial pressure in the relaxation phase.

Arterial blood pressure. The force which is exerted by the blood against the inner walls of the arteries; expressed in centimeters or millimeters of mercury (cm or mm Hg).

Normotensive. The normal accepted range for arterial blood pressure is 90 - 140 mm Hg for the systolic pressure and 60 - 90 mm Hg for the diastolic pressure.

Borderline hypertensive. The range where systolic pressure lies between 140 and 160 mm Hg and the diastolic pressure between 90 and 95 mm Hg. This corresponds to the upper limits of the normal statistical range.

Hypertensive. Arterial blood pressure readings where systolic pressure is above 160 mm Hg and/or when diastolic pressure is above 95 mm Hg.

A. essential (primary) hypertension. The disease process where no precise cause can be detected; 95% of all cases.

B. secondary hypertension. The disease process where precise causes can be identified; 5% of all cases.

Aggregate cost figures. Total costs (direct and indirect) to society. It is difficult to break the total down into various groupings; therefore, these figures must be estimated.

Cost-effectiveness (of a health care practice). The net cost in dollars per unit of health benefits gained. The lower the ratio of costs to effectiveness, the more cost-effective a given health program is.

Opportunity costs. The value of the best alternative use of resources.

Yield (in terms of health). The extent to which risk in the entire workforce is lowered. It is assessed from available reports of intervention.

Compliance. The extent to which a person's behavior (keeping appointments, taking medication, executing life-style changes) coincides with medical advice.

Testing procedure. A fabric covered cuff is wrapped around the arm just above the elbow, and inflated until blood stops flowing through the artery in the arm. Air is then gradually released to reach the relaxation rate. To be really accurate, the physician should take the blood pressure reading twice in one visit.

Factors

The previously mentioned definitions are not "perfect" definitions. With regard to hypertension there are other factors that must be taken into consideration before one can classify a person as hypertensive or otherwise. First, genetic and social factors need to be examined. Age plays a part because arterial pressure is not stable throughout life. As people age blood pressure tends to rise progressively; therefore, what is normal for a 65 year old person might be considered too high for a younger person. Because of this natural tendency, each individual should discuss his/her situation with a doctor to decide what actions should be taken to control blood pressure (Michael O'Donnell, 1986, p. 96). Gender must also be taken into account when judging the normality of arterial pressure. Women normally have lower arterial pressures than men of similar age; therefore, with all other things being equal a

woman has less a chance of falling into the hypertensive range.

Hypertension is a disease unique to humans; more specifically it is related to industrial development. Primitive populations living apart from the industrial world are not affected by hypertension (Philippe Meyer, 1980, p. 11). It seems that people in these populations remain protected from hypertension as long as they maintain their primitive way of life. If they migrate toward industrialized regions or adopt a style of life similar to ours, then blood pressure increases become a concern. Also, along the lines of social factors, blacks are about twice as likely as Caucasians to develop high blood pressure (Thomas Wilson, 1986, p. 280). This fact may reflect an interaction between a modern high-salt diet and genes that adapted to a historical scarcity of salt. Those persons with ancestors who consumed little salt are at greater risk because their genes tend to make them less tolerant of the salt in a modern diet. Additionally, anyone who has an immediate family member with hypertension is at a greater risk, which means that hypertension does indeed have a genetic component. It is difficult to demonstrate exactly how genetic factors intervene, but hypertension is more frequent in persons from families with a history of raised blood pressure.

Along with social and genetic factors there are behavioral factors that contribute to raised blood pressure. A study conducted by Seppo Aro in 1984 set out to show correlations between various habits and blood pressure levels. The health-related habits he studied included: smoking, drinking, leisure-time physical activity, relative weight (fat-free weight), and change in weight over the time of the study (p. 334). The study was based on a sample drawn from employees of three metal industry plants. The initial sample group was followed for five (5) years to ensure stability of results. The study concluded that there is a strong and consistent association of relative weight with both systolic blood pressure and diastolic blood pressure. Cigarette smoking and frequency of mild intoxication were also associated particularly with systolic blood pressure. Weight change was the strongest predictor of diastolic blood pressure change (Table 1). Lifestyle changes and behavior modification can be used to combat these factors which can increase your risk of becoming hypertensive. A physician can make recommendations regarding diet, exercise, smoking cessation, and reduced alcohol consumption.

Finally, psychological factors or stress can effect blood pressure levels. Herbert Benson, director of Beth Israel Hospital's Division of Behavioral Medicine and Hypertension Section in Boston, has done research which has

shown that when people are under stress, their blood pressure increases, their muscles tighten, their heart rate goes up, and their breathing quickens (Johnson, p. 170). In some circumstances this response is appropriate, but if stress is prolonged it can damage the body by overstimulating it, resulting in hypertension.

In the study done by Aro, it was concluded that psychological stressors can have an effect on blood pressure; however, it has been difficult to specify exactly how stress works to force sustained elevation of blood pressure. Stress itself does not give a person high blood pressure, but the person's response to it can.

Physiological cause.

So, what is the physiological cause of high blood pressure? Dr. John H. Laragh, M. D., Chief of cardiology and director of the hypertension and cardiovascular center at New York Hospital, has found that a malfunction in the kidney's control mechanism sets off a chemical chain reaction which causes blood vessels to constrict. This in turn causes the body to retain more sodium, as well as increasing total body fluid (Johnson, p. 168). Dr. Laragh believes that the effect of either narrowed blood vessels or increased liquid is what creates hypertension.

Treatments

High blood pressure has no cure, but it can be controlled. As mentioned previously, behavior changes such

as maintaining a desirable weight, reducing dietary sodium, increasing vigorous exercise, moderating alcohol consumption, and smoking cessation are ways to assist in blood pressure control. Also, relaxation techniques can be practiced. However, medication is often needed to keep high blood pressure under control. There are three principal groups of antihypertensive drugs: 1.) Diuretics, 2.) Drugs acting on the nervous system, and 3.) Peripheral vasodilators (Meyer, p. 153).

Diuretics wash out salt (sodium) from the body by reducing the amount of water retained in the blood vessel walls. They also reduce the number of nerve impulses from the brain and decrease adrenaline. This group of drugs is the most commonly used group to control hypertension.

Drugs acting on the nervous system are called adrenergic-inhibiting agents. These drugs reduce the tension of the blood vessels by blocking the nervous or chemical stimuli that cause blood vessels to constrict.

Finally, peripheral vasodilators relax the blood vessels so that blood flows through the arteries more easily. Again, the type and amount of medication taken will be determined after consultation with a physician.

ECONOMICS OF HYPERTENSION

Health promotion

Hypertension is one of the major challenges facing American medicine simply because it affects a very large

number of people. The economics of health care, and more specifically hypertension, need to be studied in terms of the cost implications and the benefits that treatment can bring about. Employers are aware of the financial impact of rising health care costs because many of them have been faced with 20% to 80% increases in these costs over the past several years (Roger Reed, 1984, p. 41). As a result of these dramatic dollar increases many companies have decided to attack health care costs by utilizing health promotion. Health promotion educates people about health risk factors, helps people identify their health risk factors, assists them in the elimination/reduction of these risks, and assists them in maintaining healthier lifestyles. The question then becomes: Is the health promotion effort worth it? Can corporate health promotion programs have a significant impact in reducing risk factors and illnesses?

Aggregate cost figures

There are two basic ways in which information on the costs of illness and the costs of medical care can be used to influence health care decisions. The first is to use the aggregate cost figures to describe the magnitude or importance of a particular health care problem and/or solution. The second is cost-effectiveness analysis which can help in selecting between alternative approaches to treatment or uses of health care (William B. Stason, 1983, p. 250).

The economic costs of an illness are the costs that are most often brought out in the media. These costs include the economic costs of hypertension to society. Accurate estimates are hard to come by because it is difficult to separate high blood pressure from other risk factors, and it is difficult to decide how to value human life or economic productivity (Stason, p. 252).

Cost-effectiveness analysis

Cost-effectiveness analysis is backed by two assumptions: 1.) Health care resources are limited which is why costs must be contained, and 2.) Both costs and effectiveness may have different meanings to different managers. Stason has developed a multistage model for the management of hypertension (Figure 1). To develop this model he specified costs; direct and indirect. Direct medical care costs of treating hypertension include physician visits, laboratory examinations, and medications. Indirect costs include savings in death from strokes, etc. that were prevented, costs of treating medication side effects, and costs of health care in added years of life.

Measures of effectiveness considered in the model include increased life expectancy, improved quality of life from morbidity prevented, and the adverse effects of treatment on the quality of life. Cost-effectiveness results are shown in terms of the net dollar cost per year of increased quality adjusted life expectancy gained.

Stason believes that additional expenditures for hypertensive care are extremely unlikely to reduce total health care costs. He estimates that only slightly over 20% of the cost of treating hypertensives (initial diastolic blood pressure of 105 mm Hg +) will be recovered through savings from reduced hospitalization for strokes and heart attacks (p. 258).

How can the results from cost-effectiveness analysis be used by managers? Results can be used to influence decisions in the allocation of health care resources; within hypertension and between hypertension and other medical areas. Also, cost-effectiveness results can provide incentive to implement programs by showing evidence of positive indirect effects that can be realized through health care. The results by themselves will have only a limited impact, but increased awareness of costs versus benefits should achieve a lot in the direction of controlling health care costs.

Studies evaluating cost-effectiveness

The preceding overview of the "Economics of hypertension" should provide for clearer understanding of the following studies that have evaluated various cost-effectiveness measures. In 1981 Alexander G. Logan reported on his controlled study that was conducted to assess the cost-effectiveness of a work-based hypertension program in which all care was provided onsite (p. 211). Participants

(those with high blood pressure) were divided into groups for either treatment at the worksite (WS), or in the community from physicians in private practice (regular care, RC). Those in the WS group were evaluated at entry by a physician, who helped them establish a goal blood pressure. Hypertensive therapy was initiated and long-term follow-up was provided on company time. Those in the RC group were also evaluated at entry by a physician and then given an appointment with their own doctor. Screening data was sent to patients' respective doctors. Reassessment at work was done 6-12 months after program entry.

Costs were assessed for each group and were reported as the average cost per patient. Costs taken into account included medical care costs for the organization and the patient, screening costs, and treatment costs. The effectiveness measure was the average reduction in diastolic blood pressure over one year. Therefore, cost-effectiveness was calculated as the ratio of the average cost per patient to the average reduction in diastolic blood pressure over one year. Logan found that the WS program was more costly by $31.52 per patient per year, but that it was able to achieve an additional reduction in diastolic blood pressure of 5.6 mm Hg. This study showed that treatment of employed hypertensives at their work-place is both more effective and more cost-effective than usual care in the community (p. 216). The major cost saving of the WS program was the

reduction in patient cost. The work setting facilitates access to care, targets a population where the consequences of hypertension are large, and encourages longer-term follow-up. Logan concluded that effective hypertension control programs have great potential for improving productivity and/or reducing costs associated with absenteeism or premature death.

In 1983 Logan conducted another study to assess the clinical effectiveness and cost-effectiveness of monitoring blood pressure of hypertensives at work. In this study there were again two groups - a regular care (RC) group where hypertensives saw their family doctors only, and an occupational health nurse (OHN) group where employees were treated by their family doctor plus the nurse (p. 829). The cost-effectiveness of the treatment programs was again calculated as the ratio of the average cost per patient to the average reduction in diastolic blood pressure over one year. The occupational health nurse made sure that employees saw their family physician. The nurse also scheduled regular visits with employees in the OHN group to measure blood pressures, to question compliance, and to communicate results to the family physician.

The results of this study indicate that "monitoring the blood pressure of hypertensive employees at work is neither clinically effective nor cost-effective" (p. 835). The increased cost of treatment brought about by hiring and

utilizing the OHN were greater than the improvement of blood pressure reduction. However, it was determined that the treatment dropout rate in the OHN group was 5.5% lower than the RC group. This suggests that monitoring does at least influence hypertensives, despite the fact that the increased cost of treatment made this method less attractive.

Logan's two studies have shown that analyzing the costs and benefits of various hypertension control programs is a very complex process. Managers have to carefully assess the variables in their own corporate situation before making decisions about any type of health care program. It does appear that worksite hypertension control programs can be cost-effective; however, excess intervention can be costly.

In 1984, John C. Erfurt and Andrea Foote conducted a cost-effectiveness study of hypertension programs in four automobile manufacturing plants. Each plant had a different approach to follow-up. Screening procedures were the same at the four sites. At site #1 no follow-up was conducted except for a courtesy letter sent to the employee's physicians (control site). At site #2 modified follow-up was initiated, with a blood pressure counselor contacting each hypertensive employee every 6 months. At site #3 full follow-up was initiated, with contact every 6 months as well as routine contact with employees' attending physicians. At site #4 an on-site treatment program was implemented with

educational efforts put into place. To assess costs, detailed daily time records were kept by all project staff.

The largest cost was for the follow-up/monitoring activities, with administrative costs also an important consideration. The measure of effectiveness was defined as the adequacy of blood pressure control at the end of the study. It was found that the cost of intervention was lowest at site #2, at $26.26 per hypertensive employee per year, and highest at site #4, at $96.19. Site #1 did not have any intervention costs since there was no intervention. It was used only as a basis for comparison. In computing the effectiveness the data show there were large and significant improvements in the number of people who had their blood pressure under control at the end of the study, with the largest improvement at site #4. Across the three follow-up interventions, each dollar spent on the program per client resulted in an additional 1% of the hypertensive group being maintained under control (p. 897). This is the reverse of the cost-effectiveness ratio which produces the annual dollar cost per unit of effectiveness. Erfurt and Foote were able to show that work-site blood pressure control programs can be cost-effective, but that effectiveness can vary considerably, depending on the additional costs a company might incur as a result of adopting a hypertension control program.

Additional considerations

Any analysis will vary depending on how costs are measured. Costs must always be specified as costs to whom, since every cost to one party can be a benefit to another. In the previous studies mentioned, the costs were incurred by the organizations who adopted a hypertension control program for their employees. Treatment costs to the employees such as physician visits, laboratory tests, and medications were not computed.

Before making the decision to implement a blood pressure control program a company must look at many factors rather than just the cost-effectiveness ratio. If it can be demonstrated that savings in employee retirement/replacement costs, short- and long- term disability payments, and health care coverage premiums can be realized, then a work-site program would probably be feasible.

On the other hand, a firm's current benefit package might already provide coverage for various aspects of hypertension intervention (off-site care, prescriptions, etc). In this case a manager must evaluate the current policies and/or programs to determine if it would be wise to implement an on-site program. Further consideration of economic factors as well as the feasibility of specific programs should be well thought out before action is taken.

The selection of a hypertension control program depends on cost considerations; however, a minimal level of

effectiveness is usually expected. If an intervention program does not produce an adequate level of effectiveness, then a company might decide that the additional cost necessary to achieve a particular level of effectiveness is worth it (to the organization). For example, if rewards such as increased employee satisfaction, improved employee productivity, and decreased absenteeism can be seen through the implementation of a more extensive program it may be worth the extra expenditure to implement a work-site program. However, one must remember that the most common constraint on health intervention and/or education programs is budget. If the money is not available then other alternatives must be considered.

Educational intervention

Up to this point actual work-site programs have been discussed in detail. Another strategy in dealing with blood pressure control involves educational intervention. In a study conducted by Joel C. Cantor in 1985, combinations of educational interventions were evaluated to (again) determine cost-effectiveness. The three phases of the educational program used in this study included: 1.) a 5- to 10- minute interview with the patient immediately following the medical visit to clarify problems or other questions, 2.) an educational session in the home with an adult with whom the patient has the most contact, and 3.) a series of three, 1-hour group discussions centered on

hypertension management and compliance (p. 783). Costs in this study measured program costs and social costs to the patient. Measures of effectiveness evaluated behavioral risk factors, ie. medication-taking behavior, appointment-keeping behavior, and weight loss, as well as actual blood pressure readings. Study groups were divided so that some persons were getting one phase of education while others were getting combinations of two or three phases. Cantor found that the multiple interventions showed high effectiveness on most outcomes, but were costly. Modified educational efforts were more cost-effective, and more easily integrated into currently existing health programs. Single interventions, especially the home visit, can be very effective in improving blood pressure control.

The amount of educational intervention depends upon what a particular company is trying to accomplish. Again, budgets may be limited, blood pressure control objectives may vary, and organizational needs may change over time. A manager must remember that follow-up is the most expensive component of a total intervention/educational program; about 5/6 of the program involves follow-up expenses rather than screening expenses (Erfurt and Foote, 1977, p. 340). However, during subsequent years of follow-up, patients will require less time and expense on the part of a company. It is up to various company managers to assess where their organization stands in terms of blood pressure control, and

what they want to achieve in the future. When goals are established, company decision-makers can proceed to implement programs and changes.

Yield from risk reduction

Another way of approaching blood pressure control programs from a busineess standpoint is by looking at the "yield" of such a program. In terms of health, the yield from such efforts is the "extent to which risk in the entire work force is lowered" (Laura C. Leviton, 1987, p. 931). Other benefits such as increased morale, enhanced company image, and increased productivity can be realized, but the yield for health is an important justification for a company-wide intervention. Only a few workplace studies are well controlled. These studies do not always represent the entire range of work settings, populations, and outcomes; therefore, in the study involving the yield from workplace interventions all available reports are presented.

Leviton defines the outcomes in workplace studies as being participation, retention, and indicators of risk reduction. Participation rate is the proportion of the known at-risk group that is actively involved at the beginning of an intervention (P). Retention rate is the proportion of participants still involved at the end of an intervention (R). An indicator of risk is the portion of retained participants brought under control (I). These variables can then be multiplied (P x R x I) to calculate

the yield from a workplace program. Gross yield is the proportion of the work force who reduced risk, without considering what would have happened with no intervention. This figure is important when a manager is looking at the raw data collected from a study. The gross yield can show the need for intervention when it is evident that there is a high number of at-risk employees. Net yield reflects what would occurred in the absence of intervention. In other words, the net yield is the gross yield in the intervention group, minus gross yield in the control group (p. 932).

It seems that participation and retention rates in hypertension control are the highest of any workplace activity, including smoking cessation, cholesterol screening, etc. (Table 2). With all the attention given to hypertension over the past decade, one would think that the United States population had gotten the problem under control. However, as of 1988, the United States Public Health Service has found that only 11% to 24% of those who are hypertensive have their blood pressure under control (Carla L. Barnes, 1988, p. 113). This figure conflicts with the 41.2% figure that Leviton reported in 1987. Despite the fact that public awareness about hypertension is high, there are still thousands of people who are untreated or treated unsuccessfully. At each step of the process, from detection through long-term follow-up, large numbers of patients fall out of care. According to R. Brian Haynes, up to 50% fail

to follow through with referral advice, over 50% of those who begin treatment drop out within 1 year, and only about two-thirds of those who stay under care consume enough of their prescribed medication to achieve adequate blood pressure reduction (1982, p. 415).

COMPLIANCE

Problem

Low compliance has been and still is a major problem facing individuals with high blood pressure as well as employers and society in general. Compliance is the extent to which a person's behavior coincides with medical advice. The "health belief model" is the most common motivational model of compliance. It says that an individual's cooperation with health advice depends upon the extent to which that person perceives that he/she is susceptible to the disease, that the disease is serious, that treatment is beneficial, and that the barriers to compliance are possible to overcome (Haynes, p. 416).

After a person has come to the conclusion that barriers are possible to overcome, it becomes easier to enforce the importance of sticking with treatment. To efficiently manage patient compliance, accurate methods of measurement must be administered.

Monitoring attendance at appointments is critical because this is one of the first steps in developing awareness about hypertension. Along with this, patient

self-reports are a valuable way of obtaining information directly from the patient. The patient can determine his/her pattern of medication consumption from monitoring himself. Pill counts can also provide an accurate estimate of compliance over time.

Dealing with low compliance

In order to maximize an employee's compliance it is essential that his/her blood pressure be checked regularly, that oral and written feedback be provided about blood pressure levels, that the prescribed regimen be discussed, and that questions be encouraged and answered (Barnes, p. 114). Once the patient is under care for hypertension, additional efforts are usually required to maintain control. The most successful interventions for improving compliance are characterized by interactions between providers and patients. This leads to the conclusion that the level of supervision of and attention to ongoing care is a key factor. Options for interaction include rewarding the patient for improved compliance and/or lowered blood pressure, tailoring of medications to daily schedules to decrease forgetting and inconvenience, encouraging family support, encouraging self-help through group support and discussion, and negotiating a brief written contract with the patient for improvements in health behavior (Haynes, p. 419). Of course, screening programs must be supported and medication must be taken as prescribed to achieve optimal

control. In addition, previous studies have shown that regularly scheduled follow-up is also essential for hypertension control.

Once a person is thinking along the lines of longer-term control, the easier it will be to stick with a prescribed treatment program. Compliance is the sole factor in determining if a control program (work site based or otherwise) is successful. A program might look good on paper, ie. conduct regular screenings, offer educational intervention, and even follow-up programs, but if compliance remains low then the overall problem has not been solved.

CONCLUSION

Goals

The advancements made over the past decade regarding awareness and education about hypertension have been impressive. In a 1985 national public awareness survey, 92% of the adult population were aware that high blood pressure increases one's chances of having heart disease, and 73% of the population had had their blood pressure checked within the past year (Bårnes, p. 113). However, the United States Public Health Service goal of getting 60% of the population under successful long-term blood pressure control, is unlikely to be met.

The fact that so many people still do not have their blood pressure under control is cause for concern for health educators, employers, and society in general. Businesses

have found that cost savings can be realized if their work force is healthy and keeps risk factors under control. This is a primary reason for the concern of managers over their employee's lifestyles.

Future considerations

For the future it will be necessary for managers to emphasize the importance of the benefits of healthy living. Businesses will benefit by gaining a more competitive work force, and individuals will benefit from the improvements that will be seen in themselves. However, for the near future, most workplace efforts will be fairly low budget and will not have access to either the facilities or the expertise that the "model" programs take advantage of (Leviton, p. 931).

Because hypertension is the most prevalent of all cardiovascular diseases, it deserves the attention of all individuals. Through continued education and follow-up programs, progress toward obtaining improved compliance rates should be realized.

TABLE 1

AGE-ADJUSTED PARTIAL CORRELATIONS (r) BETWEEN PREDICTOR VARIABLES AND BLOOD PRESSURE (BP) VALUES AT THE BEGINNING OF THE FOLLOW-UP AND BETWEEN PREDICTOR VARIABLES AND BP CHANGE (n = 388)

Predictor variable (in 1973)	SBP in 1973 (r)	DBP in 1973 (r)	SBP change[a] (r)	DBP change[a] (r)
Relative weight	0.16	0.22	−0.02	0.04
Weight change	—	—	0.11	0.26
Intoxication	0.12	0.09	0.04	0.14
Cigarettes per day	0.14	0.08	0.01	0.10
Physical activity	0.10	0.04	0.00	0.05

[a] BP in 1978 minus BP in 1973.

$r \geq 0.10$, $P < 0.05$.

$r \geq 0.13$, $P < 0.01$.

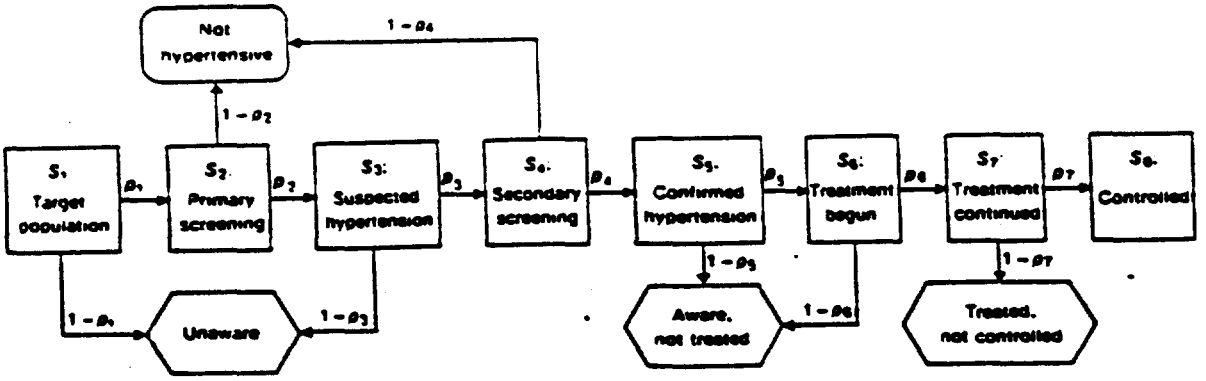

Figure 1. Multistage model for the management of hypertension

TABLE 2

Yield from Work Site Risk Reduction Activities

Outcomes	Hypertension Control	Smoking Cessation	Cholesterol Reduction
Participation Rate*			
Median percent (all studies)	75.2	45.7	45
N (all studies)	20	22	4
Median percent (published)§	75.4	66.5	50
N (published)	19	12	3
Range percent (all studies)†	37–99	1–98	22.8–82
Retention rate			
Median percent (all studies)	93	91	82.2
N (all studies)	15	15	2
Median percent (published)	93	94.5	82.2
N (published)	15	10	2
Range percent (all studies)	77–100	17–100	79.3–85
Improvement indicator‡			
Median percent (all studies)	68	32	9.5
N (all studies)	23	54	10
Median percent (published)	68	25	7.8
N (published)	22	23	8
Range percent (all studies)	23–89	9–100	0–16.2
Gross yield			
Median percent (all studies)	41.2	16.1	—¶
N (all studies)	12	11	—
Median percent (published)	41.2	18.2	—
N (published)	12	9	—
Range percent (all studies)	20.1–61.4	1.4–26.6	—

* Does not consider screening participation (see text).

† Ranges are virtually the same for published studies and for total studies.

‡ Improvement indicators were defined as percent with blood pressure 140/90 or below, percent quitting smoking, or mean percent reduction in cholesterol.

§ Published outcomes include only those in peer-reviewed journals. Two studies included gross and net yield only.

¶ See text.

*Participation rate in the hypertension control group is 75.2%, implying that programs for high blood pressure are widely taken advantage of.

*Retention rate in the hypertension control group is 93%, implying that most employees actively participate in hypertension control programs.

*Improvement was realized by 68% of the employees in the hypertension control group.

**Twelve (12) studies supplied the above outcomes.

--The gross yield of known hypertensive persons in a work force whose blood pressure is under control is 41.2%. This figure is derived by calculating participation, retention, and indicator of risk.

--The hypertension control group has had better success than smoking cessation or cholesterol reduction programs.

WORKS CITED

American Heart Association. "The Hypertension Threat." The Futurist. 20 (1986): 40-41.

Aro, Seppo. "Occupational Stress, Health-Related Behavior, and Blood Pressure: A 5-Year Follow-up." Preventive Medicine. 13 (1984): 333-348.

Barnes, Carla L. "Worksite Hypertension Control: A Guide to Success." AAOHN Journal. 36.3 (1988): 113-116.

Cantor, Joel C. et al. "Cost-effectiveness of Educational Interventions to Improve Patient Outcomes in Blood Pressure Control." Preventive Medicine. 14 (1985): 782-800.

Erfurt, John C. and Foote, Andrea. "Controlling Hypertension: A Cost-effective Model." Preventive Medicine. 6 (1977): 319-343.

Erfurt, John C. and Foote, Andrea. "Cost-effectiveness of Worksite Blood Pressure Control Programs." Journal of Occupational Medicine. 26 (1984): 892-900.

Haynes, R. Brian. "Management of Patient Compliance in the Treatment of Hypertension." Hypertension. 4 (1982): 415- 421.

Johnson, Sharon. "Facts on Hypertension." Working Woman. 10 (1985): 168-171.

Lenfant, Charles. "Advancements in Meeting the 1990 Hypertension Objectives." Journal of the American Medical Association. 257.20 (1987): 2709, 2718.

Leviton, Laura L. "The Yield from Worksite Cardiovascular Risk Reduction." Journal of Occupational Medicine. 29.12 (1987): 931-935.

Logan, Alexander G. "Clinical Effectiveness and Cost-effectiveness of Monitoring Blood Pressure of Hypertensive Employees at Work." Hypertension. 5 (1983): 828-838.

Logan, Alexander G. "Cost-effectiveness of a Worksite Hypertension Treatment Program." Hypertension. 3 (1981): 211-218.

Meyer, Philippe. Hypertension: Mechanisms and Clinical and Therapeutic Aspects. Oxford: Oxford University Press, 1980.

O'Donnell, Michael. "Hypertension May Seem Trivial, But It's Worth Worrying About." International Management. 41.4 (1986): 96.

Reed, Roger W. "Is Education the Key to Lower Health Costs?" Personnel Journal. 63.1 (1984): 41-46.

Stason, William B. Economics of Hypertension. Boston: Martinus Nijhoff Publishers Group, 1983.

Wilson, Thomas. "Historical Roots of Hypertension." Science News. 129 (1986): 280.

Activity Summary-Blue Cross Blue Shield
Spring 1988

Part B

I have spent the quarter doing research on hypertension for my thesis paper, as well as learning about various other aspects of Wellness while working with Blue Cross Blue Shield in Indianapolis. Cathy Nordholm, Hypertension Coordinator in the Blue Cross Blue Shield Wellness Resource Center, has been my guide and has provided me with several contacts in the Wellness area. I have had the opportunity to meet with a variety of people and I have learned a lot about health related issues and the implications they have for business.

The Wellness Resource Center at Blue Cross Blue Shield provides information and training to businesses through several methods/programs. These include Stay Alive and Well, Your Healthy Best, worksite based high blood pressure control, wellness payroll stuffers, and health booklets.

Stay Alive and Well is a cost-effective program that helps a company manage health care costs. The program begins with a personal health survey followed by a mini-exam (physical). Results are then reviewed with the person and the information is analyzed. Finally, employees are assigned to various intervention groups to modify their behavior, and follow-up then takes place.

Your Healthy Best is a self-help program where employees are taught positive motivation techniques and how to set personal goals for change. This program is flexible and uses any number of mediums including a video, guide book, personal fitness diary,

self-help handbook, newsletter, and lifestyle assessment profiles. An employee can do as much or as little as he/she would like toward making positive changes in his/her lifestyle.

The worksite based high blood pressure control program is set up to help employees of a company gain and maintain blood pressure control. The program includes informing all employees about high blood pressure, screening employees to detect possible causes of high blood pressure, referring all employees with high blood pressure readings to their physicians, and long-term monitoring of diagnosed hypertensives at the worksite.

Wellness payroll stuffers are used to educate employees about the use of health care services. The stuffers are an inexpensive way for an employer to provide positive health tips and information on taking better care of one's self.

Finally, health booklets are available on vital health issues. Books available include: Feel Better, Food & Fitness, Stress, and the Self-Help Handbook of Symptoms and Treatments.

These programs offer a variety of methods to educate a company's employees about the importance of wellness. The people in the Resource Center are knowledgeable about the wellness area and how wellness relates to the "business aspects" of running a company in terms of cost savings, etc. There are benefits to be realized from Wellness education at a personal level for-employees and at the company level in the form of dollars and cents.

The following information is a summary of my activities throughout the quarter. I travelled to Indianapolis this Spring and spent Tuesday afternoons and Wednesday at the Wellness Center. I was able to meet with several people and learn about their jobs as well as participate in other activities pertaining to my areas of interest.

3/15-16 Met with Phyllis Mendenhall, Senior Personnel Specialist at Blue Cross Blue Shield. Ms. Mendenhall talked about her job in personnel, and passed along some valuable insight as to what a job in human resources involves. She informed me about how the personnel function at Blue Cross Blue Shield is organized and how the various other Blue Cross offices fit into the scheme of things.

We talked about recruitment, compensation, training, and the Blue Cross Blue Shield Human Resource Information Center. The purpose of this contact was for me to learn more about what a human resource manager actually does on-the-job. I understood the various "personnel terms" that Ms. Mendenhall used, such as exempt vs. non-exempt employees, corporate salary surveys, and job analysis by way of the point method. The information I gained was helpful and I was glad to have the opportunity to talk with someone in this type of position.

3/15-16 Met with Jan Ranger of Key Health Plan (subsidiary of Blue Cross Blue Shield). Jan is a Wellness Specialist and works with various companies in a consulting capacity. She gives

presentations in the areas of CPR, smoking cessation, stress management, weight control, and high blood pressure education.

My meeting with Jan was very informative. She explained the differences between the various types of HMO's, and then proceeded to talk about the types of presentations and other work she does. This meeting provided me with a better understanding of how a "manager" functions in the wellness area, and it left me feeling optimistic that there are job opportunities in a business setting for persons interested in wellness.

4/12-13 I listened to Wayne Hedden, President of Valhalla Scientific, give a sales presentation on a body composition analysis system. This was basically a computer that hooks up to a person's body by way of electrodes and then determines one's percent body fat, total body water, target weight range, etc. The presentation was interesting because I had never seen a piece of equipment such as the one he demonstrated. I was also able to observe an actual sales pitch which made me take a look at the technique, style, and approach that were used.

4/19-20 I attended a conference of the Indiana Association of Health Educators. The Association held their spring meeting, as well as having a dinner and speaker. The evening started out with networking and I was able to meet several new people in health related fields. The speaker, Dr. Roger Pinto of the Indiana Heart Institute, had a varied background: his bachelor's degree in Personnel Management, his master's degree in Exercise

Physiology, and his doctorate in Psychology. Dr. Pinto spoke on "Helping Behavior Changes Stick: The Prevention and Treatment of Relapse". He focused on correcting undesirable behaviors (alcoholism, overweight, smoking), and then on how to maintain the new, healthy habits. He tied everything together by emphasizing the gains to be realized by the individual (and also acquaintances and employers), if he/she took control and actively pursued a healthy lifestyle.

4/14 I attended a lecture given by Jane Brody, Health and Nutrition expert - New York Times. Ms. Brody spoke about the benefits of healthy living. She specifically addressed the hazards of smoking, the importance of good nutrition, and the positive effects of a regular exercise program. The lecture reinforced my commitment to healthy living and was inspirational. My only concern was that people are often motivated after hearing a lecture such as this one, but do not carry through with implementing long-term changes. It's easy to talk about these health issues but permanent changes are often difficult to make.

5/4 I attended a presentation given by Janet ZeBell, Wellness Consultant-Blue Cross Blue Shield, at the Henry County Memorial Hospital. Janet was promoting the Stay Alive and Well program, which is one of the benefits provided to hospitals who are members of the Preferred Care network. She talked briefly about the purpose of her visit; which was to inform and elicit interest in this particular wellness program. There was a brief

slide presentation, and then Janet went through the contents of the packets she had brought along.

In this presentation there was no pressure put on the hospital administrators since the program is available to them at no charge. The hospital only has to purchase the materials from the Resource Center, while the training, etc. is done free of charge. So what does Blue Cross Blue Shield get out of "giving" this wellness program to members of the PCI system? They benefit from the networks that are created once a hospital gets involved with the program. The hospitals are free to market and promote the Stay Alive and Well material as it suits their needs or particular situations.

I learned a lot from observing this exchange. Janet was very poised and convincing, and I felt she came across as being credible. I sensed that Blake and Elaine (of the hospital) were receptive toward the program, but were being realistic in their thinking that changes take a good amount of time to be successfully implemented. I realize the importance of the whole wellness concept, but I know that seeing actual results and evidence backing the concept are the keys to making a program work.

Conclusion

These meetings and activities have given me exposure to expert views on Wellness and Personnel related issues. I have earned a lot about various positions, and I realize that there are many career paths that I could choose with my background. The practical experience I have gained should prove to be a valuable asset when I start my own career and find myself in a decision-making role.